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EXAMINER	
WONG, EDNA	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/541,011	Applicant(s) JOSHI ET AL.	
	Examiner EDNA WONG	Art Unit 1759	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 March 2011.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,5,8,11-16 and 19-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,5,8,11-16 and 19-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 28, 2011 has been entered.

This is in response to the Amendment dated March 28, 2011. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Response to Arguments

Claim Objections

Claim **1** has been objected to because of minor informalities.

The objection of claim 1 has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 112

Claims **5 and 19** have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The rejection of claims 5 and 19 under 35 U.S.C. 112, second paragraph, has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 103

I. Claims **1, 5, 8 and 11-16** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740).

The rejection of claims of 1, 5, 8 and 11-16 under 35 U.S.C. 103(a) as being unpatentable over Coury et al. in view of Giamello et al. has been withdrawn in view of Applicants' amendment.

II. Claim **19** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740) as applied to claims 1, 5, 8 and 11-16 above, and further in view of **Jen et al.** ("Determination of Hydroxyl Radicals in an Advanced Oxidation Process with Salicylic Acid Trapping and Liquid Chromatography", *J. of Chrom. A*, Vol. 796 (1998), pp. 283-288).

The rejection of claim 19 under 35 U.S.C. 103(a) as being unpatentable over Coury et al. in view of Giamello et al. as applied to claims 1, 5, 8 and 11-16 above, and further in view of Jen et al. has been withdrawn in view of Applicants' amendment.

III. Claim **20** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740) as applied to claims 1, 5, 8 and 11-16 above, and further in view of **Zhou et al.** ("Determination of Photochemically Produced Hydroxyl Radicals in Seawater and Freshwater", *Marine Chemistry* (1990), Vol. 30, pp. 71-88).

The rejection of claim 20 under 35 U.S.C. 103(a) as being unpatentable over Coury et al. in view of Giamello et al. as applied to claims 1, 5, 8 and 11-16 above, and further in view of Zhou et al. has been withdrawn in view of Applicants' amendment.

Response to Amendment

Claim Rejections - 35 USC § 103

I. Claims **1, 5, 8, 11-16 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993),

Vol. 97, pp. 5735-5740).

Coury teaches a method comprising:

(i) injecting oxygen (O_2) or air (= venture **912**, which mixes the water with fresh ozone and/or oxygen gas **915**) [col. 24, lines 45-46; and Fig. 9] to a liquid aqueous biocidal mixture containing hydrogen peroxide (H_2O_2) at an initial concentration (= the contaminated water **902** and hydrogen peroxide **905**) [col. 17, lines 39-41; and col. 24, lines 20-24];

ii) supplying a suspension of small catalyst particles **44** (col. 14, lines 26-29) to the hydrogen peroxide containing mixture (= the resulting "suspension" of small catalyst particles in the lower portions of the upper media zone near the conical coupling also tends to produce a high concentration of radicals in the water, favorably increasing the rate of decontamination of the water) [col. 17, line 64 to col. 18, line 5; and Fig. 8] and adjusting the pH of the mixture containing hydrogen peroxide and small catalyst particles to a value of from 7.2 to 9.7 (= adjusting the pH of the fluid F to about pH 7 to pH 10) [col. 13, lines 40-41], the small catalyst particles is at a concentration (col. 14, lines 26-29); and

iii) irradiating the mixture containing hydrogen peroxide and small catalyst particles with UV light having a wavelength of from 190 to 390 nm (= an assortment of free radical inducers can be used, such as, but not limited to, _UV_, manganese dioxide, high pH, TiO_2, to force the initiation step) [col. 14, lines 26-29].

The oxygen is injected to the liquid aqueous biocidal mixture to saturation (=

supersaturation increases the concentration of ozone and oxygen) [col. 9, lines 14-22].

The mixture is mixed after supplying the small catalyst particles (= with the liquid moving at a proper velocity, the catalyst acts as a fluidized bed in the intended manner) [col. 17, line 39 to col. 18, line 5; and col. 20, lines 42-58], the mixing is carried out for a period of time sufficient to generate the desired amount of hydroxyl radicals (= to increase the absolute concentration of free radicals to create conditions for a chain reaction by insuring excess of radicals over terminators) [col. 13, lines 1-3].

The desired amount of hydroxyl radicals generated in the mixture is a predetermined quantity (= to increase the absolute concentration of free radicals to create conditions for a chain reaction by insuring excess of radicals over terminators) [col. 13, lines 1-3].

The method is performed in a single reaction vessel (= a vessel **910**) [col. 25, line 2; and Fig. 9].

The method of Coury differs from the instant invention because Coury does not disclose the following:

a. Wherein *__the hydrogen peroxide__* (H_2O_2) is at an initial concentration of from 2 to 250 ppm, as recited in claim ***1***.

b. Wherein the initial concentration of *__hydrogen peroxide__* in the liquid aqueous biocidal mixture is from 10 to 50 ppm, as recited in claim ***8***.

Coury teaches that peroxide, H_2O_2, in the form of a solution, may also be added

in small doses to the water being purified, to aid the formation of free radicals in the water (col. 18, lines 41-50; and col. 24, lines 1-7).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the hydrogen peroxide described by Coury with Wherein the hydrogen peroxide (H_2O_2) is at an initial concentration of from 2 to 250 ppm; and wherein the initial concentration of hydrogen peroxide in the liquid aqueous biocidal mixture is from 10 to 50 ppm because the initial concentration of the hydrogen peroxide is a result-effective variable and one having ordinary skill in the art has the skill to calculate the initial concentration of the hydrogen peroxide that would have determined the success of the desired reaction to occur, i.e., to aid the formation of free radicals in the water (MPEP § 2141.03 and § 2144.05).

c. Wherein the small catalyst particles are *magnesium oxide*, as recited in claim ***1***.

Coury teaches that the free radical initiator can be *one of several types of well known to those skill in the art* (col. 7, lines 56-57).

The implication of this unexpected finding is that any economic mix of free radical sources, such as ozone or peroxide, can be used. *Also, an assortment of free radical inducers can be used, such as, but not limited to, UV, manganese dioxide, high pH, TiO_2, to force the initiation step*. For the present invention a catalytic step with a residence time of only 3 seconds is ideal. Any further initiation provides excess self-termination. At a catalytic residence time above 12 seconds, no free ozone was generated and subsequent fouling was found. At bed velocities below about 0.2 in/second, catalyst fouling was found and loss of catalyst resulted. At bed velocities above 0.4 in/second, catalyst loss by over-fluidization was found. For the present invention, the optimum was between 0.25 and 0.34 in/second (col. 14, lines 24-38).

Other like media could be readily used. Even though the particulate material preferably acts as a catalyst to increase the speed at which chemical reactions occur within the containers, the particulate material does not affect the equilibrium of the reactions (col. 16, lines 35-39).

Like Coury, ***Giamello*** teaches the formation of free radicals. Giamello teaches that:

The interaction of hydrogen peroxide with magnesium oxide at ambient temperature leads to the decomposition of the molecule and to the parallel transformation of the oxide into the corresponding peroxide. During the process three radical species are generated and subsequently trapped into the solid peroxide matrix giving rise to an intense and reproducible EPR spectrum. *The observed radical species are the hydroxyl OH radical, the O^-, and the O_2^- radical ions* (page 5740, "Conclusions").

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the small catalyst particles described by Coury with wherein the small catalyst particles are magnesium oxide because the interaction of hydrogen peroxide with magnesium oxide at ambient temperature would have led to the decomposition of the hydrogen peroxide into three radical species: the hydroxyl OH radical, the O^-, and the O_2^- radical ions, as taught by Giamello (page 5739, left column; and page 5740, "Conclusions").

Although Coury teaches UV, manganese dioxide, high pH and TiO_2, these free radical inducers are only exemplary and the disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments (MPEP § 2123 (II)). Thus, using magnesium oxide as the free radical inducer in the method disclosed by Coury would have accomplished what Coury had proposed to do because Giamello teaches that magnesium oxide would have decomposed hydrogen peroxide into the hydroxyl OH radical, the O^- and the O_2^-

radical ions.

It has been held that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination (MPEP § 2144.06 and § 2144.07).

There is no requirement that the motivation to make the combination be expressly articulated in one or more of the references. The teaching, suggestion or inference can be found not only in the references but also from knowledge generally available to one of ordinary skill in the art. *Ashland Oil v. Delta Resins* 227 USPQ 657 (CAFC 1985). The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. *In re McLaughlin* 170 USPQ 209 (CCPA 19710; *In re Rosselet* 146 USPQ 183 (CCPA 1960). References are evaluated by what they collectively suggest to one versed in the art, rather than by their specific disclosures. *In re Simon* 174 USPQ 114 (CCPA 1972); *In re Richman* 165 USPQ 509, 514 (CCPA 1970).

d. Wherein *the magnesium oxide* within the mixture being from 2 ppm to 250 ppm, as recited in claim ***1***.

e. Wherein said concentration of *magnesium oxide* in the mixture is from 10 to 50 ppm, as recited in claim ***8***.

Coury teaches that other like *media* could be readily used. Even though the particulate material *preferably acts as a catalyst to increase the speed at which*

chemical reactions occur within the containers, the particulate material does not affect the equilibrium of the reactions (col. 16, lines 35-39).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the magnesium oxide described by the Coury combination with wherein the magnesium oxide is at a concentration of from 2 ppm to 250 ppm; and wherein said concentration of magnesium oxide is from 10 to 50 ppm because the concentration of magnesium oxide is a result-effective variable and one having ordinary skill in the art has the skill to calculate the concentration of magnesium oxide that would have determined the success of the desired reaction to occur, i.e., to increase the speed at which chemical reactions occur (MPEP § 2141.03 and § 2144.05).

f. Wherein the method is performed at ambient temperature, as recited in claim ***1***.

The method disclosed by Coury is naturally performed at a temperature. Although the temperature is not disclosed, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one having ordinary skill in the art would have understood that the method disclosed by Coury was performed at room temperature since no other temperature is specifically disclosed.

g. Wherein an enhanced generation of hydroxyl radicals (OH*) is provided, the enhanced generation being characterized by at least a two fold increase in percentage (%) of salycilic acid (SA) conversion as compared to % conversion of SA conversion as a result of treatment with UV only, as recited in claim ***1***.

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the Coury combination teaches similar method steps as presently claimed (*i.e., injecting, supplying and irradiating*). Similar processes can reasonably be expected to yield products which inherently have the same properties. *In re Spada* 15 USPQ 2d 1655 (CAFC 1990); *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155 (CCPA 195).

h. Wherein *said desired amount* of hydroxyl radicals is sufficient to achieve a biocidal effect in the mixture, as recited in claim ***12***.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the desired amount of hydroxyl radicals by Coury with said desired amount of hydroxyl radicals is sufficient to achieve a biocidal effect in the mixture because the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of

obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

i. Wherein ***said period of time*** is from 3 seconds to 5 hours, as recited in claim ***13***.

j. Wherein ***said period of time*** is from 30 second to 100 minutes, as recited in claim ***14***.

k. Wherein ***said period of time*** is more than 5 hours, as recited in claim ***15***.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the period of time for the mixing described by Coury with (i) to (k) above because:

(i) The period of time for the mixing is a result-effective variable and one having ordinary skill in the art has the skill to calculate the period of time for the mixing that would have determined the success of the desired reaction to occur (MPEP § 2141.03 and § 2144.05). The mixing would have ensured that all of the reactants contacted each other and reacted with each other.

(ii) It is within the level of ordinary skill in the art to operate a process continuously. *In re Dilnot* 138 USPQ 248; *In re Korpi* 73 USPQ 229; *In re Lincoln* 53 USPQ 51 (MPEP § 2144.04(V)(E)).

II. Claim **19** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury**

et al. (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740) as applied to claims 1, 5, 8, 11-16 and 21 above, and further in view of **Jen et al.** ("Determination of Hydroxyl Radicals in an Advanced Oxidation Process with Salicylic Acid Trapping and Liquid Chromatography", *J. of Chrom. A*, Vol. 796 (1998), pp. 283-288).

Coury and Giamello are as applied above and incorporated herein.

The method of Coury differs from the instant invention because Coury does not disclose quantification of the desired amount of hydroxyl radicals, the quantification comprising reacting the hydroxyl radicals, if present in the mixture, with salicylic acid, as recited in claim ***19***.

Jen teaches using liquid chromatography indirectly to detect hydroxyl radicals after a trapping reaction with salicylic acid in an advanced oxidation process (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the hydroxyl radicals described by Coury by quantification of the desired amount of hydroxyl radicals, the quantification comprising reacting the hydroxyl radicals, if present in the mixture, with salicylic acid because it is conventional in an advanced oxidation process to trap hydroxyl radicals using salicylic acid as taught by Jen (abstract).

III. Claim **20** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740) as applied to claims 1, 5, 8, 11-16 and 21 above, and further in view of **Zhou et al.** ("Determination of Photochemically Produced Hydroxyl Radicals in Seawater and Freshwater", *Marine Chemistry* (1990), Vol. 30, pp. 71-88).

Coury and Giamello are as applied above and incorporated herein.

The method of Coury differs from the instant invention because Coury does not disclose wherein the liquid aqueous biocidal mixture is water selected from the group consisting of sea water and municipal effluent water, as recited in claim ***20***.

Coury teaches that *<u>any economic mix of free radical sources, such as ozone or peroxide, can be used</u>* (col. 14, lines 24-26). The instant claimed invention can be practiced on any aqueous stream which contains an unacceptable level of impurities, such as suspended matter, organics, dissolved mineral matter, dioxins, microorganisms, and color bodies (col. 20, lines 59-62; and col. 21, lines 41-56).

Like Coury, ***Zhou*** teaches the formation of free radicals. Zhou teaches that the highly reactive hydroxyl radical (OH) is photochemically formed in seawater (page 71, abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the liquid aqueous biocidal mixture described by

Coury with wherein the liquid aqueous biocidal mixture is water selected from the group consisting of sea water and municipal effluent water because highly reactive hydroxyl radical (OH) would have been photochemically formed in seawater, as taught by Zhou (page 71, abstract).

IV. Claims **22-24 and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740).

Coury and Giamello are as applied for the reasons as discussed above and incorporated herein.

The method of Coury differs from the instant invention because Coury does not disclose wherein the supplying step is before the injecting step, as recited in claim ***22***.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by the Coury combination with wherein the supplying step is before the injecting step because the selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. See *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946).

V. Claim **25** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury**

et al. (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740) as applied to claims 22-24 and 27 above, and further in view of **Jen et al.** ("Determination of Hydroxyl Radicals in an Advanced Oxidation Process with Salicylic Acid Trapping and Liquid Chromatography", *J. of Chrom. A*, Vol. 796 (1998), pp. 283-288).

Coury, Giamello and Jen are as applied for the reasons as discussed above and incorporated herein.

VI. Claim **26** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Coury et al.** (US Patent No. 6,361,697 B1) in view of **Giamello et al.** ("Evidence of Stable Hydroxyl Radicals and Other Oxygen Radicals Species Generated by Interaction of Hydrogen Peroxide with Magnesium Oxide", *J. Phys. Chem.* (1993), Vol. 97, pp. 5735-5740) as applied to claims 22-24 and 27 above, and further in view of **Zhou et al.** ("Determination of Photochemically Produced Hydroxyl Radicals in Seawater and Freshwater", *Marine Chemistry* (1990), Vol. 30, pp. 71-88).

Coury, Giamello and Zhou are as applied for the reasons as discussed above and incorporated herein.

RE: REMARKS

Applicants state that the Final Office Action seems to suggest that "magnesium oxide" taught in Giamello can replace Coury's "manganese dioxide". Applicants respectfully submit that the Examiner is using *impermissible hindsight* in constructing a hypothetical substitution utilizing magnesium oxide. *Applicants note that many elements besides magnesium oxide are contemplated as free radical inducers*. More particularly, the enormous size of the genus "free radical inducers" disclosed in Coury does not teach or suggest the specific species of alkaline earth metal oxide catalysts, to which "magnesium oxide" belongs. *Moreover, since Giamello's "magnesium oxide" belongs to a species of the enormous group of species within the genus "free radical inducers", there is no teaching or suggestion to substitute Giamello's magnesium oxide for Coury's manganese dioxide*. In addition, Coury teaches away from such a substitution because Coury expressly teaches alternative "free radical inducers" including UV, high pH, and TiO_2, *none of which are alkaline earth metal oxide catalysts*.

In response to Applicants' argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Applicants' disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA

1971).

The rejection is not overcome by pointing out that one reference does not contain a particular limitation when reliance for that teaching is on another reference. *In re Lyons* 150 USPQ 741 (CCPA 1966). Moreover, it is well settled that one cannot show nonobviousness by attacking the references individually where, as here, the rejection is based on a combination of references. *In re Keller* 208 USPQ 871 (CCPA 1981); *In re Young* 159 USPQ 725 (CCPA 1968).

Coury teaches that:

> The implication of this unexpected finding is that any economic mix of free radical sources, such as ozone or peroxide, can be used. *Also, an assortment of free radical inducers can be used, such as, but not limited to, UV, manganese dioxide, high pH, TiO_2, to force the initiation step*. For the present invention a catalytic step with a residence time of only 3 seconds is ideal. Any further initiation provides excess self-termination. At a catalytic residence time above 12 seconds, no free ozone was generated and subsequent fouling was found. At bed velocities below about 0.2 in/second, catalyst fouling was found and loss of catalyst resulted. At bed velocities above 0.4 in/second, catalyst loss by over-fluidization was found. For the present invention, the optimum was between 0.25 and 0.34 in/second (col. 14, lines 24-38).

Giamello teaches that:

> *The interaction of hydrogen peroxide with magnesium oxide at ambient temperature leads to the decomposition of the molecule* and to the parallel transformation of the oxide into the corresponding peroxide. During the process three radical species are generated and subsequently trapped into the solid peroxide matrix giving rise to an intense and reproducible EPR spectrum. *The observed radical species are the hydroxyl OH radical, the O^-, and the O_2^- radical ions* (page 5740, "Conclusions").

Although Coury teaches UV, manganese dioxide, high pH and TiO_2, these free radical inducers are only exemplary and the disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or

nonpreferred embodiments (MPEP § 2123 (II)). Thus, using magnesium oxide as the free radical inducer in the method disclosed by Coury would have accomplished what Coury had proposed to do because Giamello teaches that magnesium oxide would have decomposed hydrogen peroxide into the hydroxyl OH radical, the O^- and the O_2^- radical ions.

It has been held that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination (MPEP § 2144.06 and § 2144.07).

There is no requirement that the motivation to make the combination be expressly articulated in one or more of the references. The teaching, suggestion or inference can be found not only in the references but also from knowledge generally available to one of ordinary skill in the art. *Ashland Oil v. Delta Resins* 227 USPQ 657 (CAFC 1985). The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. *In re McLaughlin* 170 USPQ 209 (CCPA 19710; *In re Rosselet* 146 USPQ 183 (CCPA 1960). References are evaluated by what they collectively suggest to one versed in the art, rather than by their specific disclosures. *In re Simon* 174 USPQ 114 (CCPA 1972); *In re Richman* 165 USPQ 509, 514 (CCPA 1970).

Applicants state that considering the enormous size of the genus of "free radical inducers" disclosed in Coury, a *prima facie* case of obviousness has not been

established.

In response, the rejection is not overcome by pointing out that one reference does not contain a particular limitation when reliance for that teaching is on another reference. *In re Lyons* 150 USPQ 741 (CCPA 1966). Moreover, it is well settled that one cannot show nonobviousness by attacking the references individually where, as here, the rejection is based on a combination of references. *In re Keller* 208 USPQ 871 (CCPA 1981); *In re Young* 159 USPQ 725 (CCPA 1968).

Although Coury teaches UV, manganese dioxide, high pH and TiO_2, these free radical inducers are only exemplary and the disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments (MPEP § 2123 (II)). Thus, using magnesium oxide as the free radical inducer in the method disclosed by Coury would have accomplished what Coury had proposed to do because Giamello teaches that magnesium oxide would have decomposed hydrogen peroxide into the hydroxyl OH radical, the O^- and the O_2^- radical ions.

Applicants state that thus, while being perhaps stable, the hydroxyl radicals of Giamello are trapped and isolated within the magnesium peroxide matrix. The concentration of a reactive radical obtained according to Giamello would be too low to be used in any chemical reaction, such as Coury's decontamination reactor system. Consequently, Giamello teaches away from the use of Coury's free radicals for reaction

with contaminates.

In response, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Applicants state that any attempt to use the trapped radicals provided by Giamello would be inefficient and essentially ineffective in Coury's decontamination reactor system.

Applicants state that the as-filed application distinguished that magnesium oxide is not a trapping agent; instead magnesium oxide's surface provides the area that allows the hydroxyl radicals to be generated and later reacted to a trapping agent like salicylic acid.

In response, the reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by the Applicants. *In re Linter* 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); *In re Dillon* 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), *cert. denied*, 500 US 904 (1991) [MPEP § 2144].

Applicants state that thus, while Giamello may teach the use of hydrogen peroxide and magnesium oxide for generating stable, trapped radicals, those Giamello stable, trapped radicals are unavailable and ineffective for use as a reagent for treatment of a liquid biocidal mixture since the radicals, as taught by Giamello, are trapped in the magnesium peroxide matrix. Furthermore, one skilled in the art reading Giamello would not have been expected to obtain free radicals, as desired by Coury as the former explicitly states that <u>*the radicals are entrapped in the magnesium peroxide matrix*</u>, and <u>*Coury requires untrapped radicals for reaction with contaminants*</u>. Thus, as detailed above, considering the express teachings of Giamello, a *prima facie* case of obviousness has not been established.

In response, if magnesium oxide was used as the free radical inducer in the method disclosed by Coury, would there be trapped radicals there? If so, how can that be because using magnesium oxide as the free radical inducer in the method disclosed by Coury would read on the combination of magnesium oxide, hydrogen peroxide, oxygen and irradiation with UV light ($MgO/H_2O_2/O_2/UV$), as claimed in present claim 1. Similar processes can reasonably be expected to yield products which inherently have the same properties. *In re Spada* 15 USPQ 2d 1655 (CAFC 1990); *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155 (CCPA 195).

Applicants state that manganese, a transition metal, and magnesium, an alkaline earth metal, are two entirely different chemical entities.

In response, although Coury teaches UV, manganese dioxide, high pH and TiO_2, these free radical inducers are only exemplary and the disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments (MPEP § 2123 (II)). This is no so much as a substitution of a transition metal with an alkaline earth metal, but a reading of the broader disclosure that Coury teaches that would have accomplished what he had proposed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey T. Barton can be reached on (571) 272-1307. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1759

EW
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